

Raman Study of Diamond Particles under Pressure

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We report Raman measurements of diamond particles under hydrostatic pressure. Two types of particles have been studied; the first type is clusters composed of nanocrystalline scale crystallites while the second is sub-micron diamond powder. The nanocrystalline diamond clusters were prepared by an explosive synthesis technique, whereas the sub-micron particles by a large volume press technology. A comparison of our results with Raman signals obtained from single crystal bulk diamond allows us to draw conclusions with regard to both pressure and size dependencies of the Raman signal. Two important quantities, namely, the FWHM and the shift of the Raman signal will be discussed. Work performed under the auspices of the U.S. DOE by the LLNL under contract No. W--7405--ENG--48.